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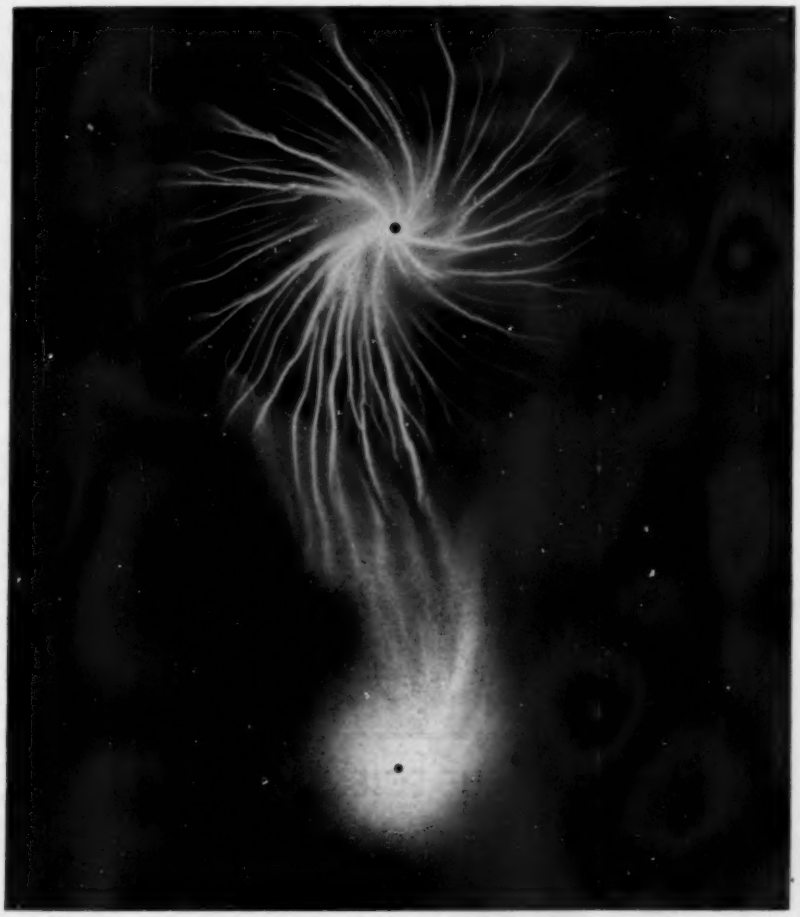
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



APRIL 22, 1933

Fingerprints of Electricity

See Page 248

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXIII No. 628

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

The first hybrid water lily was bred in 1851.

Denmark's one colonial possession is Greenland.

Glass, although fragile, possesses greater compressive strength than granite.

The custom of using funeral wreaths of flowers is at least as old as Egypt of 1500 B.C.

Accidents, of one sort or another, injured one person out of every 14 in this country last year.

A good deal of arthritis found in horses is occasioned by working the animals before they are mature.

Daily weather records were kept in Europe as early as the middle of the seventeenth century.

The gases used in luminous colored signs are mainly neon for red, argon for blue, helium for yellow.

The United States uses more than 30,000,000,000 tin cans each year, and has no tin deposits of real consequence.

In the Athenian market place, archaeologists have unearthed verses inscribed on a stone in memory of the battle of Marathon.

The leaves of rhubarb contain a considerable amount of oxalic acid and should not be eaten: only the stalks should be used as food.

Keeping muskrats is absolutely prohibited by a new order in Great Britain.

Early childhood is the worst time to have measles—not the most favorable time, as many mothers still believe.

Experiments show that ultraviolet rays and radio vibrations may affect properties of chemicals and drugs.

Directly photographing the interior of the stomach is made possible by apparatus devised in a Belgian laboratory.

German physicians recently reported that heart disease is responsible for more than one-third of the deaths of locomotive engineers.

The government is making final tests of a new variety of potato, the Chippewa, for use in northern states from Michigan to North Dakota.

Modern flood lighting has even reached Indo-China, where the great Buddhist shrine, the Shwe Dagon Pagoda at Rangoon, now shines dazzlingly at night.

The U. S. Forest Service planted seed from young Douglas fir trees and seed from old trees and found that age of the tree supplying seed did not affect growth or development of seedlings.

Ceres wheat, an improved variety developed by the North Dakota Agricultural College, enabled farmers of the state to harvest over two million dollars more wheat in 1932 than they would have gathered from Marquis wheat.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY
What 3,000 piece puzzle did archaeologists piece together? p. 245. *The Temple of the Warriors—Earl H. Morris—Scribner's*, 1931, $5.

CHEMISTRY
What happens to piperidine vanadate when it is put in the light? p. 244.

ENGINEERING
Do federal regulations permit the broadcasting of all sound frequencies? p. 243.
What is a Lichtenberg figure? p. 248.

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Is Canada larger than the United States? p. 243.

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Why might diabetic women need a slightly different diet from diabetic men? p. 248.

PSYCHOLOGY
How many completely color-blind persons have been found in America? p. 244.

TOXICOLOGY
What do chemists mean by the mass law? p. 244.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in U. S.

ENGINEERING

"Auditory Perspective" Given To Electrical Transmission

New Method Will Bring Orchestra To National Academy With Greater Range and Control of Tone and Volume

THREE LOUD SPEAKERS on a stage empty of human beings but bathed in colorful light, three telephone lines running to three microphones in a soundproof room containing the Philadelphia Symphony Orchestra, Leopold Stokowski whirling electrical control knobs instead of wielding a baton, telephone engineers alert in operating the electrical circuits.

These were the ingredients of the most advanced development of musical reproduction that will be introduced to the public in a Philadelphia-Washington concert for the National Academy of Sciences on April 27.

In a private preview for scientists and music critics held at the Academy of Music in Philadelphia, the American Telephone and Telegraph Company engineers demonstrated the results of two years of scientific research conducted with the collaboration of Director Stokowski.

Whispers and Thunder

Wagnerian music was played with whispering pianissimi and thunderous crescendos hitherto unheard by human ears. Stokowski by the turn of a control knob could subdue his orchestra, isloated in another part of the theater, to a mere trickle of sound or he could build up their music to the sound of two thousand musicians at a peak of output.

Brünhilde, sung by Miss Agnes Davis, became an electrical super-vocalist, rising above the orchestral accompaniment of the Götterdämmerung. Wagner's music was rendered as probably he never dared to dream it might be played.

This merging of music and telephone science has introduced jointly three factors in the electrical reproduction of orchestral music: 1. Auditory perspective. 2. Tone and overtone control. 3. Volume control.

Three loud speakers at left, right and center of the empty stage, each connected with a similarly placed microphone on the remote stage of the actual performers, give perspective to the music and sounds. Musicians could tell just where the violins or horns were placed. In one demonstration, stage hands moved across the distant stage and the audience of the empty stage "followed" them about the empty stage by using their ears. Engineers had previously felt that this illusion of auditory perspective might be obtained only with many loudspeakers on the empty stage, but three were found to give perfect results when the electrical transmission had high quality.

Nine Octaves

A wide range of nine musical octaves, from three below middle C to nearly six above, was utilized for the first time in electrical transmission of music. This corresponds to all frequencies from about 35 cycles per second to about 16,000 cycles per second. Radio by federal regulation is limited to a band of 5,000 cycles per second. When experimentally the high and low frequencies are chopped off by electrical filters the damage to the tone and overtone qualities was readily apparent. Each of the three telephone wires carried the full range of frequencies, and the frequency channels utilized therefore roughly totaled nine times those of the most perfect radio transmission.

In loudness range, the orchestra or other sound being transmitted can be varied from an output equivalent to a millionth of a watt to a sustained hundred watts and even a kilowatt at momentary peaks without distortion. The sound in the demonstration was raised from the rustle of leaves to beyond that of a roaring airplane engine.

Practical applications are foreseen by the telephone engineers and Director Stokowski. A symphony orchestra in one place may render its concerts with perfect tonal quality and with improved volume in a hundred or a thousand different halls in distant cities. Music may be spread from high towers so that 100,000 may enjoy it in large parks. The musician and composer can add electrical amplification and control to his material out of which beautiful sound compositions are wrought.

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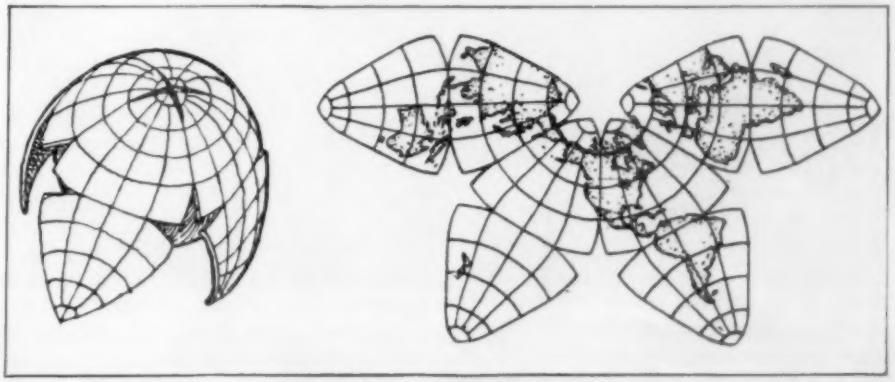
GEOGRAPHY

New Map Suggested As Accurate World Picture

CANADA'S size is no longer misrepresented to the world and Russia's vast domains are reduced to their proper proportions on a new map proposed by B. J. S. Cahill, an architect of Oakland, Calif.

Slice an orange into quarters and mash the peeling flat under a glass allowing the quarters to pop open a bit along the equator. That is the way the new map is formed and hence, from its peculiar shape, the name butterfly map. The idea was proposed by Mr. Cahill 23 years ago, but he has recently expanded the original suggestion and worked out three forms of the butterfly map in detail.

One form, pictured below, projects the area of the earth accurately so that the size of a far north country may be fairly compared with that of one nearer the equator. Thus Canada is properly represented smaller than the United States instead of more than (*Turn Page*)



SLICING UP THE EARTH

twice the size of this country, as it appears on the Mercator maps widely used in geographies and atlasses.

On a chart of another form of the butterfly map, any straight line is a great circle. Thus it is possible to find the exact distance between any two points simply by measuring it directly on the map. At the present time such a course must be calculated. A straight line across Mercator's map from San Francisco to Libson, for example, would go through the United States to Chesapeake Bay, whereas the real short route is by way of Winnipeg, Hudson Bay and Labrador.

A third type of the butterfly map is suggested as a base for weather charts. Its scale increases equally in both directions.

Science News Letter, April 22, 1933

MEDICINE

Monoxide Poison Victim Unable to do Arithmetic

A CASE of carbon monoxide poisoning which left the patient unable to do any arithmetic has been reported by Drs. H. Douglas Singer and Abraham Low of Chicago, Ill. The name of the strange ailment is acalculia, meaning inability to do simple arithmetical calculations.

The patient was the 44-year-old assistant superintendent of a firm of boiler and water tank engineers. In the course of his work he had to estimate the costs of jobs and to keep track of the time and wages of the men under him. His employers had been well satisfied with his work. When the psychiatrists examined him following the poisoning, he was unable to do such simple arithmetic as adding 5 plus 6.

He had been found unconscious in his garage one day after work, evidently overcome by carbon monoxide from the exhaust of his automobile which he had been inspecting. He was unconscious for several days. When he regained consciousness he suffered from confusion and forgetfulness of various things. For example, he could not dress himself properly, putting his right foot into his left trouser leg. When the sheet on the left side of his bed became wrinkled, he pulled at the sheet on the right side in an effort to straighten it. He had difficulty in locating and using his fingers and could not tell time, although he could tell the numerals on a watch or clock.

He gradually improved in these respects, but could not learn to write legibly nor to do simple arithmetic, even after months of instruction. He could do what psychologists call mental counting, meaning the one, two, three, four, kind. But he could not count or add three trucks and four automobiles to make a total of seven vehicles. That is, he could not count discontinuous objects.

A number of cases of acalculia have been reported in cases of mental disease in which there were other signs of aphasia or forgetfulness. However, this is apparently the first case of this strange condition occurring as the only after-effect of carbon monoxide poisoning.

Science News Letter, April 22, 1933

TOXICOLOGY

Scientist Wants Liquor Regulated as Narcotic

AFTER REPEAL of the eighteenth amendment the stronger alcoholic beverages must be absolutely separated from the weaker ones and controlled essentially as morphine and cocaine are controlled under the Harrison act.

So warned Prof. Yandell Henderson of Yale University, who, as he expressed it to the medical scientists meeting in Cincinnati, acted as toxicologist for Congress of the United States. It was on Prof. Henderson's authority that the alcoholic content of beer was fixed at 3.2 per cent.

The alcohol question is a problem in national toxicology, Prof. Henderson declared. He considers the stronger alcoholic beverages to be in a class with the narcotic drugs, morphine and cocaine, while the weaker alcoholic beverages he classes with coffee and tobacco.

He pointed out that what the chemists call the mass law applies to this question. That is, any chemical in high concentration acts powerfully, but when sufficiently diluted it loses its harmful action.

Science News Letter, April 22, 1933

PSYCHOLOGY

Man Sees Gray World Entirely Without Colors

THE DISCOVERY of a young man who sees a completely colorless, gray world was revealed by Dr. Frank A. Geldard, of the University of Virginia.

Only ten other such cases have hitherto been discovered in America. There are many who cannot tell the green of a "go" light from the red of a "stop" light, but inability to see any thing but gray color in spring flowers, vivid millinery, or gaily painted pictures is extremely rare.

Mr. J. M., 23-year-old graduate student, as Dr. Geldard identified the unusual individual in reporting him to the scientists, was asked to pick out a card containing red or reddish dots. He picked one with red, green and gray spots. Then the test cards were shuffled and he was asked to pick a card with green or greenish dots. He picked the same red, green, gray dotted card.

Careful study of this interesting case, which was facilitated by the fact that Mr. J. M. is a graduate student and co-operated willingly, showed conclusively that the eyesight defect is caused by failure of the cones of the eye's retina to operate, Dr. Geldard said.

Mr. J. M.'s vision is entirely through the rods of his retina, giving him vision only in twilight illuminations. His acuity of vision is only one-tenth normal and he is extremely nearsighted. Bright flashes of light temporarily blind him and crossing a street on a sunshiny day is a dangerous adventure for him.

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CHEMISTRY

New Light-Sensitive Substance Found

A NEW MEMBER of the family of chemical substances that turn dark on exposure to light was announced to the American Chemical Society by Dr. Oskar Baudisch of Yale University and Dr. F. L. Gates of Harvard University.

This is piperidine vanadate. Its crystals change from their original white to black or brown on exposure to light just a little down the wave-length scale from the invisible ultraviolet. The new compound, however, is still so new that practical applications have not yet been suggested.

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ARCHAEOLOGY—PALEONTOLOGY

World's Jig-Saw Champions

From Thousands of Time-Worn Pieces They Patiently Build Temples, Mosaics, Vases, Skeletons or What Have You

By EMILY C. DAVIS

MEET the world's jig-saw champs—the archaeologists.

Paleontologists run a close second.

The men who wear these double-jointed titles specialize in jig-saw jobs that make the hardest pastime puzzles look like a third grade child's home-work.

You hear puzzle fans these days talking in hushed tones of puzzles made of seventeen-hundred-pieces! Well, one puzzle in turquoise mosaic solved by scientific skill had 3,000 pieces, tiny pieces at that.

You hear dramatic tales of jig-saw fans working for hours, even days on some terror of a puzzle. But there was one scientific puzzle—it was a dinosaur when they got it together—that took the National Museum seven years.

There is nothing novel about a jig-saw puzzle to an archaeologist. Inviting him to help put a picture puzzle together at a party would be about like the classic joke of suggesting to the postman that he might take a walk for diversion on his day off. Still, if you could lure one of these specialists to try a hand at the game, you might find his methods interesting and worth copying.

The archaeologist works sometimes with pinhead pieces. Then again, the puzzle is made of stone blocks bigger than your head.

Down in Yucatan, a Mexican temple buried in the earth is a puzzle on the grand scale. Building blocks have been dislodged by the persistent tugging of tropical plants. Great stones have gone crashing down the steep pyramid on which the temple once perched. Hundreds of the pieces lie broken, scattered in the soil with edges sticking up here and there.

When Earl Morris of the Carnegie Institution of Washington reconstructed the great Warriors' Temple at Chichen Itza, in Yucatan, he had to hunt all over the place for pieces belonging to his building. Vandals, he said, had hurled blocks down the slopes for the sport of watching the descent. Modern Indians with ideas of improving their own buildings had taken pieces away from the ruined temple to fit into walls and walks.

One of the staff who worked on the front wall of the Warriors' Temple spent days poring over the sculptured masks and mosaic panels he was trying to arrange. He had the stones spread out on the terrace, and there he worked in the hot sun, shifting his heavy puzzle pieces. Each piece of sculptured mosaic weighed from 40 to 100 pounds.

The archaeologists found that they could call down to the Indian workmen who were digging out buried stones, and say, "Look out for a piece eleven inches long with a hand carved on it." And presently an Indian would come up with the piece. And sure enough it would fit.

Time and again, they found they could do that.

The same expedition met the puzzle of the 3,000-piece turquoise mosaic. Here was a picture puzzle with a good many pieces lying in place, so that the pattern could be made out. But it lay in a stone jar, discovered under the temple floor. The wood on which the mosaic had originally been mounted was turned to dust.

How to remove the thousands of tiny pieces of blue and green stone from the dusty jar and to set the pattern on a firm backing was a real problem. The archaeologists of the expedition, who had worked so masterfully with their giant stone puzzle blocks, declared that this was no task for them. They wired to New York for a museum expert to come down to solve the puzzle.

Mosaic of this sort is something for puzzle fans to examine. The largest of the turquoise pieces was less than a third of an inch square. The smallest was one-forty-eighth of an inch. And the stones were sliced very thin, besides. There were almost no helpful curves and odd-shaped pieces. The stones were mostly rough squares of different sizes. With these flecks of color, the Indian artist had constructed eight panels, radiating from the center, and in four of the panels he had made profiles of that popular Mexican deity, the Feathered Serpent.

It is a long way, conversationally, from a delicate plaque of turquoise to a club-tailed glyptodon. But they are both puzzles of the mosaic type. An old glyptodon does not look it, when he is neatly fitted together and en-

PUZZLE CHAMPION AT WORK

The piecing together of puzzles is no fad to Neil M. Judd, curator of archaeology at the U. S. National Museum. It is a part of Mr. Judd's work to restore ancient pottery and other articles from hundreds and sometimes thousands of fragments.

shrined in a glass case. Nothing could look more solid than a glyptodon with his low-hung body, spiky club tail and bone blanket. But that same animal represents thousands of bone pieces, painstakingly fixed in their proper places.

When dug up—paleontologists first catch their puzzles and then put them together—a glyptodon's fossil bones have an exasperating way of scattering. So, there is nothing to do except gather up the pieces and ship them back to the laboratory and there assemble the beast. The shell alone is made of thousands of little squarish monotonous pieces. Glyptodons were distant relatives of the modern armadillos. A well-grown glyptodon stood as high as an ox.

Scientific puzzlers have been known to put together a table full of bones and to get the wrong picture.

It was particularly easy to make mistakes with the old dinosaurs that lived so many million years before men inherited the earth. Nobody ever saw a dinosaur. Before the dinosaurian bones began to be unearthed, about a hundred years ago, no human being ever dreamed that such creatures had existed. Naturally enough, some of the early attempts at solving the dinosaurs were funny, even funnier than the dinosaurs themselves really look.

There was the Iguanadon, for example. When the first set of Iguanadon bones was dug up, quite a few parts were missing and others were scattered.

Dr. Frederic A. Lucas of the American Museum of Natural History once described with a chuckle the laboratory adventures of that Iguanadon.

"Among the first of the remains found," he wrote, "were some sharp pointed bones not unlike small horns; so one was not unnaturally placed like the horn of a rhinoceros on the nose of the animal. Later it was found that this spine was really a thumb, and it was pointed out that to put his thumb to his nose was really an undignified gesture for so ancient an animal."

One of the longest animals ever assembled is the Diplodocus, a dinosaur 75 feet long. The pieces of this puzzle weighed almost two tons. They were shipped to the U. S. National Museum from the original home of the giant creature in Utah. The Diplodocus, with the appropriate, plodding name, lived about 150 million years ago.

To obtain the two tons of fossilized bones, the Museum had to carry off almost 50 tons of rock in which the bones were firmly embedded. Back in the Museum laboratories began the task of chipping the rock off the bones.

To keep the long body of the puzzle beast from falling apart when set upright, a steel support had to be devised. That was a problem in itself. Altogether, the laboratory worked on that gigantic jig-saw dinosaur for seven years. It was finished and wheeled up to its place of honor in the hall of the dinosaurs in 1931.

The most jig-saw-like of all scientific puzzles are the broken dishes that have to be put together again. Some of these are found in a Humpty-Dumpty state of wreckage that would seem to defy human ingenuity. But where all the king's horses and all the king's men might fail, archaeologists have been known to work just a little longer and more ingeniously and to produce almost magic results. They can't always do it. But some of their successes are amazing.

Big water jars found in the ruins of Indian pueblos in the Southwest are often shattered in several hundred pieces when found. So are the big pottery bottles that the Incas of Peru used for carrying water. And so are vases from Greece and Egypt.

One yellow vase from Crete offered an interesting puzzle picture. There were 86 pieces to be assembled. When the piecework was done, there was a scene of the realistic writhings of two octopods on the curved surface.

Some of the most famous objects in museums are masterpieces of jig-saw art. Take the Portland Vase, sometimes referred to as the most famous vase in the world. This fragile glass vase was found in the sixteenth century. It was removed from a Roman tomb where it had lain sealed up since the third century A.D.

The graceful beauty of the vase, rescued from its dark resting place, was acclaimed. It was made, in cameo technique, of two layers of glass. The outer layer was opaque white. The layer beneath that was a deep soft blue. The artist had cut out the white layer, leaving a scene in white against the blue background.

In 1786, the Duke of Portland paid $5,000 for the vase. In 1845, it was reposing in state in the British Museum when an insane man took it into his head to smash it into a hundred pieces. Today it is as beautiful as ever.

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NEUROLOGY

Scientists Study Goats That Become Rigid When Excited

GOATS so nervous that a shout causes them to become rigid and motionless were described to the members of the American Association of Anatomists.

Drs. Sam L. Clark, Frank H. Luten and Jessie T. Cutler of Vanderbilt University, Nashville, Tenn., rendered a scientific report on the nervous goats whose peculiar condition is evidently due to an inherited abnormality of the central nervous system.

The goats are so nervously constituted that excitement of any kind makes them perfectly rigid and they cannot move for a few moments. If they try to run, they fall down and for several minutes cannot bend their legs under themselves in order to get up. The condition is inherited. The rigidity may be brought on by a shout or other noise, by the goat's losing its balance in trying to climb, or by any kind of excitement.

The strain of goats is found in Tennessee and northern Alabama. Similar goats were reported by a traveller in Palestine, Dr. Clark said.

According to local history, a man travelled through Tennessee late in the last century with four of these goats and a sacred cow of India. He needed money, so sold the goats, but took the cow with him. All the nervous goats of that part of the country are said to have descended from those four.

Dr. Clark and associates find that the condition is not due to any muscular ailment, nor could they find anything in the blood of these goats different from other goats. Giving them adrenalin excites them, but does not cause the rigidity.

Discovered in New Books—

Propaganda

● "WHERE PROPAGANDA is used for selfish purposes we decry it, but we depend upon it all the time to keep the wheels of civilization going. Gossip, pull, influence, tact, personality, will, oratory, rhetoric, salesmanship, executive ability, getting friends and using them, getting jobs and keeping them, managing children, managing parents, running schools, homes, factories, governments—it is all a matter of propaganda, of getting people to take the attitudes which have proved most profitable or convenient to those in power. *Truth* about people or events or causes or things does not count. It is what is said about them that molds our attitudes, and the truth is helpless against convincing misrepresentation." — Hugh Hartshorne in CHARACTER IN HUMAN RELATIONS (*Scribners*).

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Life

● "I AM A CITIZEN of the British Empire, which includes the great Dominions. My high-brow friends complain that the Dominions have produced little great art or literature. I answer that at least they have done something unique. Before the war the average expectation of life of a baby born in New Zealand was sixty years, in Australia fifty-seven years, in Denmark, the next healthiest country, fifty-six years. England also ran. Since then other countries have caught up to a large extent, but New Zealand and Australia still seem to be leading. I am proud to belong to a commonwealth which has won the first and second places in the great race against death."—J. B. S. Haldane in SCIENCE AND HUMAN LIFE (*Harpers*).

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Oil

● "THE TOTAL amount of crude oil in the earth's crust is unknown, and unestimated, but it is assuredly a staggering volume. Geologists state that oil discovery is a possibility in 1,100,000,000 acres in the United States alone, or 56 per cent. of its total land area. The contrast of this huge territory with about 2,500,000 acres which are now producing oil, makes it certain that new fields will continue to be discovered and that the oil of this country will prove ample for many years to come. It has even been estimated that in the 35-foot thickness of limestone underlying Chicago there are over 7,000,000 barrels of oil to each square mile. What is true regarding the potential oil resources of the United States is probably true in even greater measure for many countries of the world, where oil exploration has been less thorough."—Gustav Egloff in EARTH OIL (*Williams and Wilkins*).

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Research

● "IF SCIENCE is to be kept from stagnation it is absolutely essential to encourage research in all kinds of new and unusual fields which offer little or no hope of direct financial return. That nation which fails to encourage pure research for its own sake quickly reaches a state of intellectual decay."—Physics staff of the University of Pittsburgh in AN OUTLINE OF ATOMIC PHYSICS (*Wiley*).

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Lucky Babies

● "SOME DAYS were lucky some unlucky, and yet others indifferent. The day I Cipactli, for instance, was very lucky. Boys born on this day had a prosperous future in front of them. If of noble family they would prove to be great leaders and the owners of much property. If of humble birth they would be honest, brave and never in want. Similarly children born on I Acatl, or the following twelve days, would be traitorous or given to the practice of witchcraft. Unhappy was the fate of those born on one of the thirteen days starting at I Calli. If they did not die a violent death in battle or as sacrificial victims, they stood a good chance of being caught in adultery, and suffering death as a punishment. About the best they could hope for was to be forced by want to sell themselves into slavery.

"Actually it was possible to avert impending ill-fate of this nature by a little manipulation. The most usual method of doing this was to postpone the ceremony held four days after birth to some later date when the fates were more auspicious."—J. Eric Thompson in MEXICO BEFORE CORTEZ (*Scribners*).

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Flies

● "WHY DID the world endure the housefly so long? I remember a meeting of the American Civic Association in Washington. Dr. Woods Hutchinson of New York had talked to the meeting about the housefly. He said very bad things about it and commended the Association on its strenuous efforts to promote the warfare against it. At the conclusion of his lecture, a dear old lady arose in the audience and said, with breathless indignation, 'In the name of the women of the United States and of that of the Society for the Prevention of Cruelty to Animals, I protest against the wholesale murder of these defenseless creatures.' Perhaps that was one of the reasons."—L. O. Howard in FIGHTING THE INSECTS (*Macmillan*).

Science News Letter, April 22, 1933

Importance

● "WE HUMANS, in contemplating ourselves, are prone to marvel at our own importance. Because we know how to build an Empire State Building that is ten times as high as it is wide at the base and yet will not collapse or tip over; because we know how to build and operate a ship that is a fifth of a mile long and yet will not break in two in the middle; because we know how to separate continents and join oceans; because we know how to weigh the Sun and the stars, determine their dimensions, temperatures, and the materials of which they are made up; because we know how to modify Nature and create animals, vegetables, fruits and flowers to suit our needs or our pleasure, some of us think we are an important factor in this world. But there may be considerable doubt about this importance. When we draw apart and contemplate ourselves from a detached viewpoint, we discover some amazing things."—Hiram Percy Maxim in LIFE'S PLACE IN THE COSMOS (*Appleton*).

Science News Letter, April 22, 1933

Youth

● "PHYSICIANS have of late made a strong effort to discover the fountain of youth. That fountain will not be found through physical means alone. If a human being were made young by gland therapy, or through other physical rejuvenation, he would still be an old man. His mind must be rejuvenated if he is to be looked upon as salvaged, and (*Turn to Page* 250)

In Science Fields—

CHEMISTRY

Morphine Analyzed In Search For Substitute

PROGRESS in the search for a new, safe morphine was reported by Dr. Nathan B. Eddy of the University of Michigan at the meeting at Cincinnati of the Federation of American Societies for Experimental Biology.

Dr. Eddy is engaged in research sponsored by the drug addiction committee of the National Research Council. The object of the research is to produce, if possible, a substitute for morphine which will have that drug's valuable pain-relieving and sleep-inducing qualities but none of its dangerous habit-forming propensity.

The morphine molecule consists of a number of chemical units arranged to form a series of rings. Among these two units, known as hydroxyl groups because they are made up of hydrogen and oxygen, are appended to the rings. At present, Dr. Eddy is trying to find which of the units is responsible for relieving pain, which for quieting nerves and inducing sleep, and which for the sense of well-being that leads to habit formation.

He reported that the two hydroxyl groups have opposite effects in the action of morphine in the body. One of them increases the pain-relieving and other useful properties of morphine, while the other hydroxyl group decreases the same properties.

Science News Letter, April 22, 1933

ENGINEERING

Sparking Process Studied With Lichtenberg Figures

See Front Cover

WHAT IS an electric spark made of, is the question partly answered by the brilliant whirligig figure on the front cover of this week's SCIENCE NEWS LETTER. The picture is one of several hundred made during research by Prof. C. Edward Magnusson of the University of Washington, Seattle. Prof. Magnusson's studies are yielding valuable information on the mechanism of the electric sparkover process.

Engineers studying the effect of lightning on high voltage transmission lines use such designs as that on the cover, known as Lichtenberg figures, to estimate the voltage of tremendous discharges caused by lightning. With a special set-up they take a picture of the discharge on an ordinary photographic emulsion and the result is a Lichtenberg figure.

At the University of Washington the same procedure was carried out on a smaller scale in the laboratory. Instead of making the discharge in open air, Prof. Magnusson enclosed his apparatus in an air-tight envelope connected to a vacuum pump and photographed figures at very low pressures. He also studied discharges in a magnetic field.

The picture on the cover is one of the most striking taken. The dot at the top represents the positive terminal pressed against the photographic place and the bottom dot, actually about three inches away, the negative terminal.

Science News Letter, April 22, 1933

PHYSIOLOGY

Female Uses Sugars And Starches Differently

A FUNDAMENTAL difference between the sexes in the way the body takes care of the sugars and starches of the diet was reported by Dr. H. J. Deuel, Jr., of the University of Southern California, to the American Federation of Societies for Experimental Biology.

Fasting adult male rats had more sugar stored in their livers than did the females, Dr. Deuel and associates found, while the females had more fat stored in the liver than the males. There was no difference in immature rats. Dr. Deuel was trying to find why women develop a condition of much greater acidosis during fasting than men do. Apparently it is because of their smaller store of sugar and larger store of fat.

The problem is important in connection with diabetes in which this kind of acidosis develops when the patient is on a sugar-free diet. It indicates that diabetic women might need a slightly different diet from diabetic men. When the ovaries were removed, female rats had as much sugar stored in their livers as did normal males, Dr. Deuel found. When these rats were given doses of theelin, a female sex hormone, the sugar stored in their livers was the same amount as that of normal females.

Science News Letter, April 22, 1933

METEOROLOGY

New Weather Station on Massachusetts Mountain

ON ISOLATED 2018-foot Mt. Wachusett in central Massachusetts, a new meteorological station has been established under the auspices of Blue Hill Observatory, Harvard University, in connection with the work of the International Polar Year. Unlike the Mt. Washington Observatory, however, there will not be resident observers. A meteorograph, designed and built by Prof. S. P. Fergusson to run two or three months without attention, is keeping the record of wind direction and velocity, atmospheric pressure, temperature and humidity.

The meteorograph and the exposed elements were prepared and adapted by F. B. Towle and his son, Philip, of Holden, Mass., who will also look after the station weekly.

The wind vane and three-cup anemometer, loaned by the U. S. Weather Bureau, are exposed a few feet above the mountain's fire tower and are connected to the pens which record the wind direction and velocity on the large drum of the meteorograph in the fire-lookout room. Under the eaves of the summit-house tower, the temperature and humidity elements are exposed in a louvered box to protect them from the full force of the gales that beset this summit. A coil of brass and steel is indicating the temperature, while a bundle of 150 strands of child's hair, prepared by Clifford L. Davis of Worcester, operates the humidity recorder.

Science News Letter, April 22, 1933

● EARTHQUAKES: WHAT ARE THEY?

▼ by

RADIO ▲

Dr. J. B. Macelwane

Professor of Geophysics at St. Louis University, St. Louis, and president of the Jesuit Seismological Association

This address will be given Friday, April 28, at 12:45 P. M., over stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

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Continued from Page 247

this we believe to be true, because we have so often found the characteristics attributed to the old in the very young." —Lillien J. Martin and Clare de Gruchy in SWEEPING THE COBWEBS (*Macmillan*).

Science News Letter, April 22, 1933

Gutter

● "ON THE SUBJECT of imparting instruction about sex, I once wrote that in my experience the gutter is a very good school. And I was roundly abused for it. My critics seemed to believe that I thought only of the smut and filth of the gutter. But I did not. I was regarding that quality which the gutter shares with Sophocles, of seeing life steadily and seeing it whole."—Logan Clendening in PREPARATION FOR MARRIAGE, edited by K. M. Walker (*Norton*).

Science News Letter, April 22, 1933

Change

● "ALL CHANGE is relative. The universe is expanding relatively to our common material standards; our material standards are shrinking relatively to the size of the universe. The theory of the 'expanding universe' might also be called the theory of the shrinking atom."—Sir Arthur Eddington in THE EXPANDING UNIVERSE (*Macmillan*).

Science News Letter, April 22, 1933

Marriage

● "NUMBERS have played a tremendous part in marriage—witness monogamy, polyandry, polygyny, polygamy, and concubinage, to cite only five noteworthy manifestations of numerology in human mating."—E. T. Bell in NUMEROLOGY (*Williams and Wilkins*).

Science News Letter, April 22, 1933

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● "ONE of the fascinating new chapters in the book of science is the story of the internal secretions. Their potency is almost unbelievable. Their influence is pervasive in all that we do and are. In the present they cooperate in determining the forms of our bodies and the working of our minds. In the past they may have set the pattern of our advancement through the ages."—R. G. Hoskins in THE TIDES OF LIFE (*Norton*).

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THE HUMAN PERSONALITY—Louis Berg—*Prentice-Hall,* $3.

INTELLECTUAL DEVELOPMENT, vol. II of the First Two Years—Mary M. Shirley—*Univ. of Minnesota,* $3.

THE PHYSICAL DIMENSIONS OF CONSCIOUSNESS—Edwin G. Boring—*Century,* $2.25.

PROBLEMS IN HUMAN ENGINEERING—F. Alexander Magoun and his students—*Macmillan,* $2.60.

PSYCHOLOGY—Shepherd I. Franz and Kate Gordon—*McGraw-Hill,* $2.50.

PSYCHOLOGY LABORATORY MANUAL—W. L. Valentine—*Prentice-Hall,* $2.

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FISHES OF BERMUDA—W. Beebe—*Putnam,* $3.50.

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A MANUAL FOR THE IDENTIFICATION OF THE BIRDS OF MINNESOTA AND NEIGHBORING STATES—T. S. Roberts—*Univ. of Minnesota,* $1.50.

NATURE BY NIGHT—A. R. Thompson—*R. O. Ballou,* $3.50.

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ZOO ANIMALS—W. S. Berridge—*Macmillan,* $1.25.

ZOOLOGY—Robert H. Wolcott—*McGraw-Hill.*

Miscellaneous

HOLLOW FOLK—Mandel Sherman and Thomas R. Henry—*Crowell,* $2.

LIFE IN LESU—Hortense Powdermaker—*Norton,* $4.

THE NEW APPLIED MATHEMATICS—S J. Lasley and M. F. Mudd—*Prentice-Hall,* $1.60.

NUMEROLOGY—E. T. Bell—*Century* (*Williams & Wilkins*), $4.

SAVAGERY TO CIVILIZATION—Fay-Cooper Cole—*Williams & Wilkins,* $1.

SOCIAL ANTHROPOLOGY—Paul Radin—*McGraw-Hill,* $3.50.

ZOOLOGICAL PARKS, AQUARIUMS AND BOTANICAL GARDENS—L. C. Everard—*Amer. Assn. of Museums,* $1.

This list includes late winter and spring titles already published and books promised by publishers later in the year. As financial advertisements and time tables are fond of reciting, this information is based on authoritative data, not guaranteed and subject to change.

Science News Letter, April 22, 1933

• First Glances at New Books

Archaeology

THE LOST EMPIRES OF THE ITZAES AND MAYAS—Theodore A. Willard—*Arthur H. Clark Co.*, 449 p., $6. Mr. Willard has an entertaining style. It is too bad that he blends with good material fantastic ideas that scientific research workers no longer take seriously. He suggests that "the lost continent of Atlantis" might have cradled the Mayan civilization. He is convinced that some foreign origin must be found to account for Mayan achievements. He gives the impression that the Mayas had a monotheistic religion, by writing repeatedly of Itzamna, referring to him as "Itzamna, whose religion fostered subservience to one God."

Science News Letter, April 22, 1933

Archaeology

THE SEALAND OF ANCIENT ARABIA—Raymond Philip Dougherty—*Yale Univ. Press*, 203 p., $3. Reasons for locating in Arabia the mysterious Sealand of the ancient world are impressively brought together by Prof. Dougherty. Since Arabia is almost entirely closed country to archaeological expeditions, the case rests at present mainly on clues in cuneiform tablets and other historic evidence. Prof. Dougherty's identification of the Sealand brings into a clearer focus many obscure angles of ancient history, notably certain origins of Hebrew religion.

Science News Letter, April 22, 1933

Astronomy-Biology

LIFE'S PLACE IN THE COSMOS—Hiram Percy Maxim—*Appleton*, 177 p., $2.50. Known to the world as the great inventor of the Maxim silencer and other ordnance, and as an enthusiastic radio and cinema amateur, Mr. Maxim looks at the heavens and speculates as to whether they contain life as does the earth.

Science News Letter, April 22, 1933

Aviation

FLYING—James E. Fechet—*Williams and Wilkins*, 138 p., $1. A former chief of the United States Army Air Corps, foreworded by Eddie Rickenbacker, writes a concise account of aviation, past, present and future, as one of the Century of Progress Series.

Science News Letter, April 22, 1933

Bacteriology

THE STORY OF MICROBES—Paul W. Allen—*Bookmill Company (Knoxville)*, 459 p., $3.75. A briskly written, popular but solidly filled book on the history of bacteriology and the role of bacteria in disease, agriculture and other of their manifold activities. It is excellently illustrated with black-and-white drawings. It will be useful on the reference shelf of the student, interesting in the library of the layman.

Science News Letter, April 22, 1933

Chemistry

CHEMISTRY TRIUMPHANT—William J. Hale—*Williams and Wilkins*, 151 p., $1. A stimulating volume, written by one of America's leading chemical creators, which will throw new light on the social revolution raging about us. Particularly interesting is Dr. Hale's chemical interpretation of history.

Science News Letter, April 22, 1933

Endocrinology

THE TIDES OF LIFE—R. G. Hoskins—*Norton*, 352 p., $3.50. The endocrine glands have proved a fascinating subject to layman and scientist. In this volume the scientist tells the layman all that science has learned about these enormously important and in many respects still mysterious glands. While non-technical, the book is not written with the juvenile appeal of many popular books on health. It is, however, a clear, comprehensive and accurate presentation of facts and their significance. A Scientific Book Club selection.

Science News Letter, April 22, 1933

Engineering

ACOUSTICS AND ARCHITECTURE—Paul E. Sabine—*McGraw-Hill*, 327 p., $3.50. Architects and others who build with regard for sound will welcome this practical presentation of the rapidly developing field of acoustics by one prominent in acoustical research.

Science News Letter, April 22, 1933

Engineering

AIR CONDITIONING ENGINEERS HANDBOOK — E. V. Hill — *Aerologist Pub. Co., Chicago*, 318 p., $5. Seven separate booklets have been brought together in loose-leaf binder between leather covers to form a very complete text and hand-book for the young industry. It should be useful to all builders and contractors as well as to those directly concerned with the installation of air conditioning equipment.

Science News Letter, April 22, 1933

Ethnology

THE ESKIMOS, THEIR ENVIRONMENT AND FOLKWAYS—Edward Moffat Weyer, Jr.—*Yale Univ. Press*, 491 p., $5. This might be called an informal encyclopaedia of the Eskimos. It is filled with facts and tables, maps, charts, and footnote references to source material. Yet there is enough folklore and custom, entertainingly explained, to give the volume a place on the table for general reading, as well as its own corner on the reference shelf.

Science News Letter, April 22, 1933

Ethnology—Archaeology

MEXICO BEFORE CORTEZ—J. Eric Thompson—*Scribner*, 298 p., 33 pl., $2.50. As simply as if he were describing the picturesque ways of the Dutch or the Japanese, Mr. Thompson tells us about the life of the Aztec Indians. This approach is excellent for the reader who would like to get acquainted with the Aztecs and kindred tribes.

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Our Mineral Civilization, THOMAS T. READ
Chemistry Triumphant, WILLIAM J. HALE
Insects, Man's Chief Competitors, W. P. FLINT AND C. L. METCALF
The Story of A Billion Years, WILLIAM OTIS HOTCHKISS
Flying, MAJ.-GENERAL JAMES E. FECHET
Earth Oil, GUSTAV EGLOFF
Adjustment and Mastery, R. S. WOODWORTH
Time, Space and Atoms, RICHARD T. COX
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From Page 253

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Science News Letter, April 22, 1933

General Science

THE UNIVERSE OF SCIENCE—H. Levy—*Century,* 224 p., $2. Prof. Levy, who is professor of mathematics at the Imperial College of Science, London, challenges the whole invasion of science by philosophical idealism. He tilts with Eddington and Jeans and he insists that the line of ethical demarcation between pure and applied science cannot be maintained.

Science News Letter, April 22, 1933

General Science

WE LOOK ABOUT US—G. S. Craig and Agnes Burke—*Ginn,* 194 p., 68c. This is the first book in a new science series for elementary schools, and certainly if subsequent volumes keep up the initial standard a great success can be prophesied for the series. The scientific answers to children's endless "whys," as well as the scientific backgrounds of a thousand things that even their curiosity often takes for granted are here set forth simply, yet without unnecessary "writing down." In simple narrative style, children are shown learning meteorology from a snowman, biology from porcupines and earthworms, physics from playhouses and bowls of water. Probably not only children but often their parents and teachers will learn to use their eyes better from a proper use of this little book.

Science News Letter, April 22, 1933

Geology—Astronomy

OUR STONE-PELTED PLANET—H. H. Nininger—*Houghton Mifflin,* 327 p., $3. A popular book on meteorites with a voluminous appendix which lists the meteorites of the world by country and contains maps on which are located the principal meteorite falls.

Science News Letter, April 22, 1933

Psychology

BEHAVIOR MECHANISMS IN MONKEYS—Heinrich Klüver—*University of Chicago Press,* 387 p., $4. A comprehensive and thorough study of the behavior and mental abilities of several varieties of monkeys. As Dr. Lashley comments in the introduction, the author "presents for the first time something approaching a complete picture of the perceptual world of an animal. This perceptual organization is surprisingly like that of man."

Science News Letter, April 22, 1933

Psychology

PROBLEMS IN HUMAN ENGINEERING—F. Alexander Magoun and his students—*Macmillan,* 535 p., $2.60. A textbook to aid engineering students to become acquainted with the various human problems they are likely to meet during their professional career. Informal discussions of what to do when the boss steals all the credit, when the foreman gives you an unpleasant nickname, when the other fellow gets the promotion, when there is dissension among your subordinates, and finally when you receive ten thousand a year.

Science News Letter, April 22, 1933

Psychology

SWEEPING THE COBWEBS—Lillien J. Martin and Clare de Gruchy—*Macmillan,* 181 p., $1.50. A practical handbook of exercises for mental rejuvenation by the chronologically aged but mentally vigorous author of "Salvaging Old Age" and her assistant in the first old age clinic. Miss Martin insists that old age has its beginning in the cradle, so if you are any age at all you will be interested in this volume that tells you how to keep that schoolgirl personality.

Science News Letter, April 22, 1933

Psychology—Education

CHARACTER IN HUMAN RELATIONS—Hugh Hartshorne—*Scribner's,* 367 p., $2.50. This book is the outgrowth of a long program of experimental study. The author tells what is now being done to develop character in the young; he discusses various theories of character; and gives his own point of view. The parent, the educator, and the sociologist will find practical suggestions for procedures mingled with more general statements of theory.

Science News Letter, April 22, 1933

Physics

AN OUTLINE OF ATOMIC PHYSICS—Physics Staff of the University of Pittsburgh—*John Wiley and Sons,* 348 p., $3.50. Unusual in that it is the joint work of seven members of the physics staff of a large university, this book

Allergy and Immunity in Ophthalmology
By ALAN C. WOODS
188 *pages,* $2.25

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First Glances at New Books

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grew out of a course of lectures given for some years to college men and women who had completed a year's work in physics but who expected to devote their lives to professions other than physics. It should prove useful for reference reading as well as a textbook.

Science News Letter, April 22, 1933

Physics

THE RELATIVITY THEORY SIMPLIFIED —Max Talmey—*Falcon Press,* 186 p., $1.50. The boyhood friend of Prof. Einstein, a layman and a well-trained amateur, explains the relativity theory and, what is more important perhaps, tells the story of the formative period of Einstein. The introduction is by Dr. George B. Pegram, professor of physics at Columbia.

Science News Letter, April 22, 1933

Psychiatry

CRIMES AND CRIMINALS—*William A.* White—*Farrar and Rinehart,* 276 p., $2.50. This discussion by the director of St. Elizabeth's Hospital, the Government Hospital for the Insane at Washington, D. C., will prove stimulating to all thoughtful readers and all students of an important modern problem. The chapter on capital punishment is particularly noteworthy, while the closing chapter, in which Dr. White draws on his long experience for illustrative stories, will probably be of most interest to the general reader. The book has been recommended by the Book of the Month Club.

Science News Letter, April 22, 1933

Sex Hygiene

PREPARATION FOR MARRIAGE—Edited by Kenneth M. Walker—*Norton,* 175 p., $2. Introduction by Logan Clendening. This book "for married people and those intending marriage," was originally planned as a symposium of the view of different specialists on the subject of preparation for marriage. In order to give it cohesion and remove from it the too impersonal note of the laboratory, the contributed material was rewritten by Mr. Walker. The book aims to be useful by giving advice in a practical, simple way.

Science News Letter, April 22, 1933

Horticulture

THE NEW ILLUSTRATED GARDENING ENCYCLOPAEDIA — Richard Sudell—*Scribner's,* 1152 p., $3.75. Although written primarily for use in Britain, with a special eye to the problems of British climate and soil, this low-priced one-volume cyclopaedia of horticulture will have its wide uses also on this side of the water. Its descriptions and illustrations of thousands of cultivated varieties are quite as pertinent in North America as they are in the author's own country.

Science News Letter, April 22, 1933

Mathematics

NUMEROLOGY—E. T. Bell—*Williams and Wilkins,* 176 p., $2. The professor of mathematics in the California Institute of Technology, who under the name of John Taine occasionally writes detective stories, combines his two talents in this delightful and satiric exposé. Let those who may be scared by its title be assured that instead of being won to false science they will learn much science from this volume which is authoritative in very many aspects and at the same time readable. "Although numbers cannot lie they have a positive genius for telling the truth with intention to deceive." Now go on with the story.

Science News Letter, April 22, 1933

Medical Economics

THE COSTS OF MEDICAL CARE—I. S. Falk, C. Rufus Rorem, Martha D. Ring—*University of Chicago Press,* 623 p., $4. This bulky volume, fortunately indexed, summarizes and analyzes the facts discovered in the various studies made by the Committee on the Costs of Medical Care. While the volume is large, it probably will be quicker and easier for the average person to get his information on the subject from this volume than from trying to read all the others in the series.

Science News Letter, April 22, 1933

Nutrition

FOOD IN HEALTH AND DISEASE—Katherine Mitchell Thoma—*F. A. Davis Co.,* 370 p., $2.75. A practical text on dietetics and nutrition designed for nurses which might also be helpful to the housewife, particularly if some member of her family requires a special diet. While such special diets are discussed, the importance of an adequate general diet is stressed. There are many recipes as well as the theoretical discussion, and there is a copious index.

Science News Letter, April 22, 1933

Standardization

STANDARDS YEARBOOK 1933—Bureau of Standards—*Govt. Print. Off.,* 255 p., $1. This guide book to standardization both official and industrial is now an important annual publication of the United States Bureau of Standards. In it are summarized the activities of international standardizing agencies, national standardizing laboratories and national industrial standardizing bodies as well as the work of the federal standardizing agencies of this country and the work of the Bureau of Standards and other similar agencies.

Science News Letter, April 22, 1933

Sociology

IN PLACE OF PROFIT—Harry F. Ward—*Scribner's,* 460 p., $2.50. This study of social incentives in the Soviet Union will interest particularly psychologists and all other scientists who are concerned with the details of the Soviet experiment. The use of the dialectical method in science and the Soviet contention that science cannot be neutral in the contest of politics and the struggle of social forces will be an unconventional idea to most American scientists. Soviet scientists, the book says, in every international gathering in which they appear always attack the position of "science for science's sake."

Science News Letter, April 22, 1933

Zoology

MAMMALS AND BIRDS—*Encyclopaedia Britannica*—xx+199 p., 55 pl., $3. The publishers of the Encyclopaedia Britannica have assembled a selection of the articles on mammals and birds, published in the new Fourteenth Edition, and present them here as a single, richly illustrated volume. Useful to the student for reference, it is also a first class "picture-book" by virtue of the many fine plates, 14 of which are in color.

Science News Letter, April 22, 1933

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